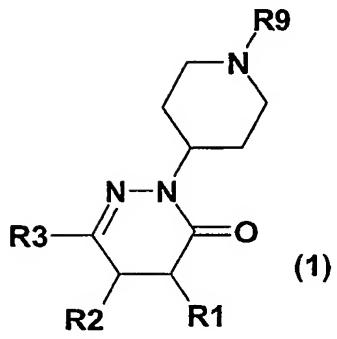
Patent claims

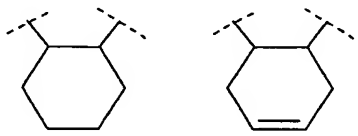
1. Compounds of formula 1



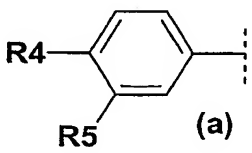
(1)

in which

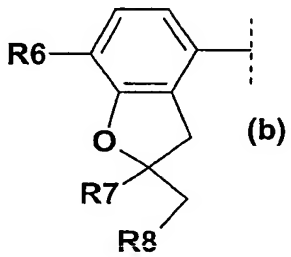
R1 and R2 represent independently from one another hydrogen or 1-4C-alkyl, or R1 and R2 together and with inclusion of the two carbon atoms, to which they are bonded, form a group selected from



R3 represents a phenyl derivative of formulae (a) or (b)



(a)



(b)

wherein

R4 is 1-4C-alkoxy or 1-4C-alkoxy which is completely or predominantly substituted by fluorine,

R5 is 1-8C-alkoxy, 3-7C-cycloalkoxy, 3-7C-cycloalkylmethoxy, or 1-4C-alkoxy which is completely or predominantly substituted by fluorine,

R6 is 1-4C-alkoxy, 3-5C-cycloalkoxy, 3-5C-cycloalkylmethoxy, or 1-4C-alkoxy which is completely or predominantly substituted by fluorine,

R7 is 1-4C-alkyl and

R8 is hydrogen or 1-4C-alkyl,

or wherein

R7 and R8 together and with inclusion of the two carbon atoms, to which they are bonded, form a spiro-linked 5-, 6- or 7-membered hydrocarbon ring, optionally interrupted by an oxygen or sulphur atom,

R9 is Aryl1, Aryl2 substituted by R10 and R11, $-(CH_2)_n$-C(O)-R12, -C(O)-$(CH_2)_m$-R13, -$(CH_2)_p$-R14 or -Y-$(CH_2)_q$-Z-$(CH_2)_r$-R16,

wherein

Aryl1 is naphthyl, pyrazinyl, pyridazinyl, pyrimidin-4-yl, pyrimidin-5-yl, quinazolinyl, quinoxalinyl, cinnolinyl, quinolyl, isoquinolyl, phthalazinyl, indanyl, indolyl, isoindolyl, indazolyl, chromanyl, isochromanyl, purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, isothiazolyl, pyrrolyl, pyrazolyl or thiophenyl,

Aryl2 is naphthyl, pyridyl, pyrazinyl, pyridazinyl, pyrimidinyl, quinazolinyl, quinoxalinyl, cinnolinyl, quinolyl, isoquinolyl, phthalazinyl, indanyl, indolyl, isoindolyl, indazolyl, chromanyl, isochromanyl, purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, pyrrolyl, pyrazolyl, furanyl or thiophenyl,

R10 is halogen, nitro, cyano, carboxyl, 1-4C-alkyl, trifluoromethyl, 1-4C-alkoxy, 1-4C-alkoxy which is completely or predominantly substituted by fluorine, 1-4C-alkoxycarbonyl, amino, mono- or di-1-4C-alkylamino, aminocarbonyl 1-4C-alkylcarbonylamino or mono-or di-1-4C-alkylaminocarbonyl,

R11 is hydrogen, halogen, amino, nitro, 1-4C-alkyl or 1-4C-alkoxy,

R12 is 4H-benzo[1,4]oxazin-3-one-6-yl, Aryl2 or Aryl2 substituted by R10 and R11,

R13 is 1-4C-alkoxy, phenoxy, napthalenoxy or 2-oxo-1,2-dihydro-quinolin-6-yloxy,

R14 is Aryl 3, Aryl2 substituted by R10 and R11, phenyl substituted by R15,

wherein

Aryl3 is naphthyl, pyrazinyl, pyridazinyl, pyrimidinyl, quinazolinyl, quinoxalinyl, cinnolinyl, quinolyl, isoquinolyl, phthalazinyl, indanyl, indolyl, isoindolyl, indazolyl, chromanyl, isochromanyl, purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, pyrrolyl, pyrazolyl, furanyl or thiophenyl,

R15 is purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, pyrrolyl, pyrazolyl, furanyl or thiophenyl,

R16 is hydrogen, hydroxyl, 1-4C-alkoxy, hydroxy-2-4C-alkoxy, 1-4C-alkoxy-2-4C-alkoxy, mono- or di-1-4C-dialkylamino, 1-4C-alkoxycarbonyl, amino, aminocarbonyl, mono- or di-1-4C-alkylaminocarbonyl, 1-4C-alkylcarbonyl, 1-4C-alkylcarbonylamino or –N(H)-C(O)-N(R18)R19,

Y represents a bond or –C(O)-,

Z represents a bond, –O-, -C(O)-, -C(O)-N(H)-, -N(H)-C(O)-, -N(R17)-, -S- or -$S(O)_2$-,

R17 is hydrogen or 1-4C-alkyl,

R18 and R19 are independent from each other hydrogen or 1-4C-alkyl, or R18 and R19 together and with inclusion of the nitrogen atom to which they are bonded, form a 4-morpholinyl-, 1-pyrrolidinyl-, 1-piperidinyl-, 1-hexahydroazepino- or a 1-piperazinyl-ring,

n is an integer from 1 to 4,

m is an integer from 1 to 4,

p is an integer from 1 to 4,

q is an integer from 1 to 4,

r is an integer from 1 to 4,

and the salts of these compounds – with the proviso that all those compounds of formula 1 are excluded in which Y and Z both represent a bond and simultaneously R16 is hydrogen, aminocarbonyl or mono- or di-1-4C-alkyl-aminocarbonyl, or in which Y represents –C(O)-, Z represents a bond and simultaneously R16 is hydrogen, amino or mono- or di-1-4C-alkylamino - for use in the treatment of diseases.

2. Compounds of formula 1 according to claim 1 selected from

(4aS,8aR)-2-{1-[3-(2-Amino-ethylsulfanyl)-propanoyl]-piperidin-4-yl}-4-(3,4-dimethoxy-phenyl)-4a,5,8,8a-tetrahydro-2H-phthalazin-1-one,

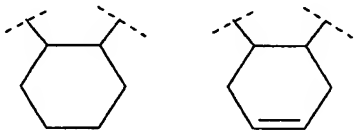
(4aS,8aR)-2-{1-[3-(2-Amino-ethylsulfonyl)-propanoyl]-piperidin-4-yl}-4-(3,4-dimethoxy-phenyl)-4a,5,8,8a-tetrahydro-2H-phthalazin-1-one,

(4aS,8aR)-2-{1-[2-(2-Amino-ethoxy)-ethyl]-piperidin-4-yl}-4-(3,4-dimethoxy-phenyl)-4a,5,8,8a-tetrahydro-2H-phthalazin-1-one,

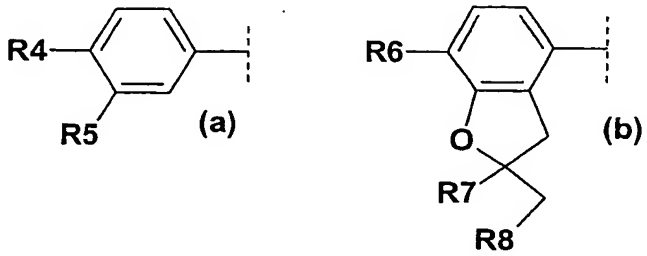
and the salts of these compounds for use in the treatment of diseases.

3. Use of compounds of formula 1 in which

R1 and R2 represent independently from one another hydrogen or 1-4C-alkyl, or R1 and R2 together and with inclusion of the two carbon atoms, to which they are bonded, form a group selected from



R3 represents a phenyl derivative of formulae (a) or (b)



wherein

R4 is 1-4C-alkoxy or 1-4C-alkoxy which is completely or predominantly substituted by fluorine,

R5 is 1-8C-alkoxy, 3-7C-cycloalkoxy, 3-7C-cycloalkylmethoxy, or 1-4C-alkoxy which is completely or predominantly substituted by fluorine,

R6 is 1-4C-alkoxy, 3-5C-cycloalkoxy, 3-5C-cycloalkylmethoxy, or 1-4C-alkoxy which is completely or predominantly substituted by fluorine,

R7 is 1-4C-alkyl and

R8 is hydrogen or 1-4C-alkyl,

or wherein

R7 and R8 together and with inclusion of the two carbon atoms, to which they are bonded, form a spiro-linked 5-, 6- or 7-membered hydrocarbon ring, optionally interrupted by an oxygen or sulphur atom,

R9 is Aryl1, Aryl2 substituted by R10 and R11, $-(CH_2)_n$-C(O)-R12, -C(O)-$(CH_2)_m$-R13, -$(CH_2)_p$-R14 or -Y-$(CH_2)_q$-Z-$(CH_2)_r$-R16,

wherein

Aryl1 is naphthyl, pyrazinyl, pyridazinyl, pyrimidin-4-yl, pyrimidin-5-yl, quinazolinyl, quinoxalinyl, cinnolinyl, quinolyl, isoquinolyl, phthalazinyl, indanyl, indolyl, isoindolyl, indazolyl, chromanyl, isochromanyl, purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, isothiazolyl, pyrrolyl, pyrazolyl or thiophenyl,

Aryl2 is naphthyl, pyridyl, pyrazinyl, pyridazinyl, pyrimidinyl, quinazolinyl, quinoxalinyl, cinnolinyl, quinolyl, isoquinolyl, phthalazinyl, indanyl, indolyl, isoindolyl, indazolyl, chromanyl, isochromanyl, purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, pyrrolyl, pyrazolyl, furanyl or thiophenyl,

R10 is halogen, nitro, cyano, carboxyl, 1-4C-alkyl, trifluoromethyl, 1-4C-alkoxy, 1-4C-alkoxy which is completely or predominantly substituted by fluorine, 1-4C-alkoxycarbonyl, amino, mono- or di-1-4C-alkylamino, aminocarbonyl 1-4C-alkylcarbonylamino or mono-or di-1-4C-alkylaminocarbonyl,

R11 is hydrogen, halogen, amino, nitro, 1-4C-alkyl or 1-4C-alkoxy,

R12 is 4H-benzo[1,4]oxazin-3-one-6-yl, Aryl2 or Aryl2 substituted by R10 and R11,

R13 is 1-4C-alkoxy, phenoxy, napthalenoxy or 2-oxo-1,2-dihydro-quinolin-6-yloxy,

R14 is Aryl 3, Aryl2 substituted by R10 and R11, phenyl substituted by R15,

wherein

Aryl3 is naphthyl, pyrazinyl, pyridazinyl, pyrimidinyl, quinazolinyl, quinoxalinyl, cinnolinyl, quinolyl, isoquinolyl, phthalazinyl, indanyl, indolyl, isoindolyl, indazolyl, chromanyl, isochromanyl, purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, pyrrolyl, pyrazolyl, furanyl or thiophenyl,

R15 is purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, pyrrolyl, pyrazolyl, furanyl or thiophenyl,

R16 is hydrogen, hydroxyl, 1-4C-alkoxy, hydroxy-2-4C-alkoxy, 1-4C-alkoxy-2-4C-alkoxy, mono- or di-1-4C-dialkylamino, 1-4C-alkoxycarbonyl, amino, aminocarbonyl, mono- or di-1-4C-alkylaminocarbonyl, 1-4C-alkylcarbonyl, 1-4C-alkylcarbonylamino or –N(H)-C(O)-N(R18)R19,

Y represents a bond or –C(O)-,

Z represents a bond, –O-, -C(O)-, -C(O)-N(H)-, -N(H)-C(O)-, -N(R17)-, -S- or -$S(O)_2$-,

R17 is hydrogen or 1-4C-alkyl,

R18 and R19 are independent from each other hydrogen or 1-4C-alkyl, or R18 and R19 together and with inclusion of the nitrogen atom to which they are bonded, form a 4-morpholinyl-, 1-pyrrolidinyl-, 1-piperidinyl-, 1-hexahydroazepino- or a 1-piperazinyl-ring,

n is an integer from 1 to 4,

m is an integer from 1 to 4,

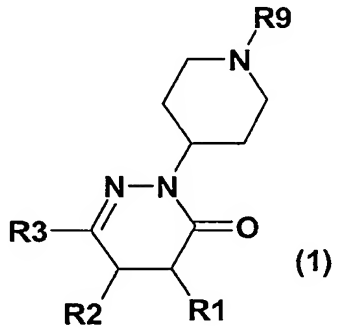
p is an integer from 1 to 4,

q is an integer from 1 to 4,

r is an integer from 1 to 4,

and the salts of these compounds – with the proviso that all those compounds of formula 1 are excluded in which Y and Z both represent a bond and simultaneously R16 is hydrogen, aminocarbonyl or mono- or di-1-4C-alkylaminocarbonyl, or in which Y represents –C(O)-, Z represents a bond and simultaneously R16 is hydrogen, amino or mono- or di-1-4C-alkylamino - for the preparation of pharmaceutical compositions for the treatment of diseases which can be ameliorated by the administration of PDE4 inhibitors.

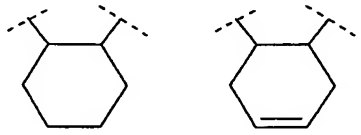
4. Compounds of formula 1



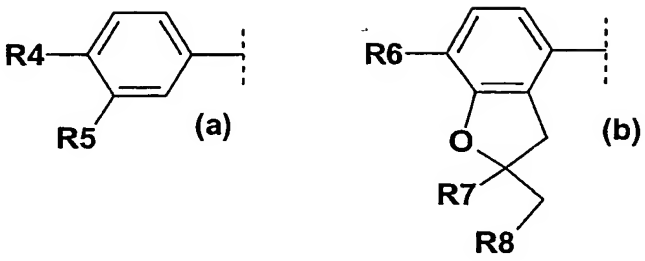
(1)

in which

R1 and R2 represent independently from one another hydrogen or 1-4C-alkyl, or R1 and R2 together and with inclusion of the two carbon atoms, to which they are bonded, form a group selected from



R3 represents a phenyl derivative of formulae (a) or (b)



wherein

R4 is 1-4C-alkoxy or 1-4C-alkoxy which is completely or predominantly substituted by fluorine,

R5 is 1-8C-alkoxy, 3-7C-cycloalkoxy, 3-7C-cycloalkylmethoxy, or 1-4C-alkoxy which is completely or predominantly substituted by fluorine,

R6 is 1-4C-alkoxy, 3-5C-cycloalkoxy, 3-5C-cycloalkylmethoxy, or 1-4C-alkoxy which is completely or predominantly substituted by fluorine,

R7 is 1-4C-alkyl and

R8 is hydrogen or 1-4C-alkyl,

or wherein

R7 and R8 together and with inclusion of the two carbon atoms, to which they are bonded, form a spiro-linked 5-, 6- or 7-membered hydrocarbon ring, optionally interrupted by an oxygen or sulphur atom,

R9 is Aryl1, Aryl2 substituted by R10 and R11, $-(CH_2)_n$-C(O)-R12, -C(O)-$(CH_2)_m$-R13, -$(CH_2)_p$-R14 or -Y-$(CH_2)_q$-Z-$(CH_2)_r$-R16,

wherein

Aryl1 is naphthyl, pyrazinyl, pyridazinyl, pyrimidin-4-yl, pyrimidin-5-yl, quinazolinyl, quinoxalinyl, cinnolinyl, quinolyl, isoquinolyl, phthalazinyl, indanyl, indolyl, isoindolyl, indazolyl, chromanyl, isochromanyl, purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, isothiazolyl, pyrrolyl, pyrazolyl or thiophenyl,

Aryl2 is naphthyl, pyridyl, pyrazinyl, pyridazinyl, pyrimidinyl, quinazolinyl, quinoxalinyl, cinnolinyl, quinolyl, isoquinolyl, phthalazinyl, indanyl, indolyl, isoindolyl, indazolyl, chromanyl, isochromanyl, purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, pyrrolyl, pyrazolyl, furanyl or thiophenyl,

R10 is halogen, nitro, cyano, carboxyl, 1-4C-alkyl, trifluoromethyl, 1-4C-alkoxy, 1-4C-alkoxy which is completely or predominantly substituted by fluorine, 1-4C-alkoxycarbonyl, amino, mono- or di-1-4C-alkylamino, aminocarbonyl 1-4C-alkylcarbonylamino or mono-or di-1-4C-alkylamino-carbonyl,

R11 is hydrogen, halogen, amino, nitro, 1-4C-alkyl or 1-4C-alkoxy,

R12 is 4H-benzo[1,4]oxazin-3-one-6-yl, Aryl2 or Aryl2 substituted by R10 and R11,

R13 is 1-4C-alkoxy, phenoxy, napthalenoxy or 2-oxo-1,2-dihydro-quinolin-6-yloxy,

R14 is Aryl 3, Aryl2 substituted by R10 and R11, phenyl substituted by R15,

wherein

Aryl3 is naphthyl, pyrazinyl, pyridazinyl, pyrimidinyl, quinazolinyl, quinoxalinyl, cinnolinyl, quinolyl, isoquinolyl, phthalazinyl, indanyl, indolyl, isoindolyl, indazolyl, chromanyl, isochromanyl, purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, pyrrolyl, pyrazolyl, furanyl or thiophenyl,

R15 is purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, pyrrolyl, pyrazolyl, furanyl or thiophenyl,

R16 is hydrogen, hydroxyl, 1-4C-alkoxy, hydroxy-2-4C-alkoxy, 1-4C-alkoxy-2-4C-alkoxy, mono- or di-1-4C-dialkylamino, 1-4C-alkoxycarbonyl, aminocarbonyl, mono- or di-1-4C-alkylaminocarbonyl, 1-4C-alkylcarbonyl, 1-4C-alkylcarbonylamino or –N(H)-C(O)-N(R18)R19,

Y represents a bond or –C(O)-,

Z represents a bond, –O-, -C(O)-, -C(O)-N(H)-, -N(H)-C(O)-, -N(R17)-, -S- or $-S(O)_2-$,

R17 is hydrogen or 1-4C-alkyl,

R18 and R19 are independent from each other hydrogen or 1-4C-alkyl, or R18 and R19 together and with inclusion of the nitrogen atom to which they are bonded, form a 4-morpholinyl-, 1-pyrrolidinyl-, 1-piperidinyl-, 1-hexahydroazepino- or a 1-piperazinyl-ring,

n is an integer from 1 to 4,

m is an integer from 1 to 4,

p is an integer from 1 to 4,

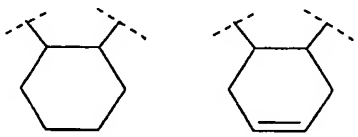
q is an integer from 1 to 4,

r is an integer from 1 to 4,

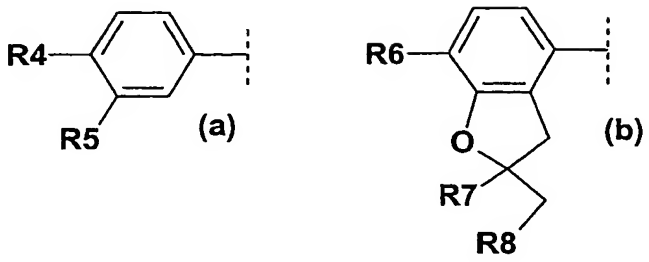
and the salts of these compounds – with the proviso that all those compounds of formula 1 are excluded in which Y and Z both represent a bond and simultaneously R16 is hydrogen, aminocarbonyl or mono- or di-1-4C-alkyl-aminocarbonyl, or in which Y represents –C(O)-, Z represents a bond and simultaneously R16 is hydrogen or mono- or –di-1-4C-alkylamino.

5. Compounds of formula 1 according to claim 4, in which

R1 and R2 represent independently from one another hydrogen or 1-4C-alkyl, or R1 and R2 together and with inclusion of the two carbon atoms, to which they are bonded, form a group selected from



R3 represents a phenyl derivative of formulae (a) or (b)



wherein

R4 is 1-2C-alkoxy or 1-2C-alkoxy which is completely or predominantly substituted by fluorine,

R5 is 1-4C-alkoxy,

R6 is 1-2C-alkoxy or 1-2C-alkoxy which is completely or predominantly substituted by fluorine,

R7 is methyl and

R8 is hydrogen,

or wherein

R7 and R8 together and with inclusion of the two carbon atoms, to which they are bonded, form a spiro-linked cyclopentane, cyclohexane, tetrahydrofurane or tetrahydropyran ring,.

R9 is Aryl1, Aryl2 substituted by R10 and R11, $-(CH_2)_n$-C(O)-R12, -C(O)-$(CH_2)_m$-R13, -$(CH_2)_p$-R14 or -Y-$(CH_2)_q$-Z-$(CH_2)_r$-R16,

wherein

Aryl1 is pyrimidin-4-yl, pyrimidin-5-yl, quinazolinyl, quinolyl, isoquinolyl, indolyl, indazolyl, purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, isothiazolyl, pyrrolyl, pyrazolyl or thiophenyl,

Aryl2 is pyridyl, pyrimidinyl, quinazolinyl, quinolyl, isoquinolyl, indolyl, indazolyl, purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, pyrrolyl, pyrazolyl, furanyl or thiophenyl,

R10 is halogen, nitro, cyano, 1-4C-alkyl, 1-4C-alkoxy, 1-4C-alkoxycarbonyl, amino, mono-or di-1-4C-alkylamino, aminocarbonyl, 1-4C-alkylcarbonylamino or mono-or di-1-4C-alkylaminocarbonyl,

R11 is hydrogen, halogen, 1-4C-alkyl or 1-4C-alkoxy,

R12 is 4H-benzo[1,4]oxazin-3-one-6-yl, Aryl2 or Aryl2 substituted by R10 and R11,

R13 is phenoxy, napthalenoxy or 2-oxo-1,2-dihydro-quinolin-6-yloxy,

R14 is Aryl 3, Aryl2 substituted by R10 and R11, phenyl substituted by R15,

wherein

Aryl3 is pyrimidinyl, quinazolinyl, quinolyl, isoquinolyl, indolyl, indazolyl, purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, pyrrolyl, pyrazolyl, furanyl or thiophenyl,

R15 is purinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, furanyl or thiophenyl,

Y represents a bond or –C(O)-,

Z represents a bond, –O-, -S- or -$S(O)_2$-,

R16 is hydrogen, hydroxyl, 1-4C-alkoxy, hydroxy-2-4C-alkoxy, 1-4C-alkoxy-2-4C-alkoxy or -N(H)-C(O)-N(R18)R19,

wherein

R18 and R19 are independent from each other hydrogen or 1-4C-alkyl, or R18 and R19 together and with inclusion of the nitrogen atom to which they are bonded, form a 4-morpholinyl-, 1-pyrrolidinyl- or 1-piperidinyl -ring,

n is an integer from 1 to 2,

m is an integer from 1 to 3,

p is an integer from 1 to 2,

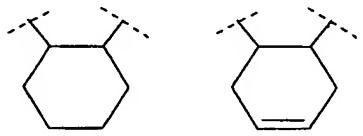
q is an integer from 1 to 3,

r is an integer from 1 to 2,

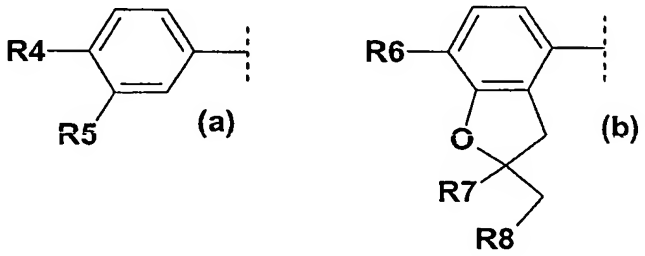
and the salts of these compounds – with the proviso that all those compounds of formula 1 are excluded in which Y and Z both represent a bond and simultaneously R16 is hydrogen, or in which Y represents –C(O)-, Z represents a bond and simultaneously R16 is hydrogen.

6. Compounds of formula 1 according to claim 4 in which

R1 and R2 together and with inclusion of the two carbon atoms, to which they are bonded, form a group selected from



R3 represents a benzene derivative of formulae (a) or (b)



wherein

R4 is 1-2C-alkoxy,

R5 is 1-4C-alkoxy,

R6 is 1-2C-alkoxy,

R7 is methyl and

R8 is hydrogen,

R9 is $-(CH_2)_n$-C(O)-R12, -C(O)-$(CH_2)_m$-R13, -$(CH_2)_p$-R14 or -Y-$(CH_2)_q$-Z-$(CH_2)_r$-R16,
wherein
R12 is 4H-benzo[1,4]oxazin-3-one-6-yl or benzofuran-2-yl,
R13 is 2-oxo-1,2-dihydro-quinolin-6-yloxy,
R14 is phenyl substituted by R15,
wherein
R15 is benzimidazolyl,
Y represents a bond or –C(O)-,
Z represents a bond, –O-, -S- or -$S(O)_2$-,
R16 is hydrogen, hydroxyl, methoxy, hydroxyethoxy, methoxyethoxy or -N(H)-C(O)-N(R18)R19,
wherein
R18 and R19 together and with inclusion of the nitrogen atom to which they are bonded, form a 4-morpholinyl-ring,

n is 1,

m is an integer from 1 to 3,

p is 1,

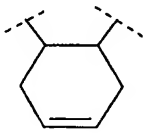
q is an integer from 1 to 2,

r is an integer from 1 to 2,

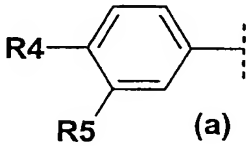
and the salts of these compounds – with the proviso that all those compounds of formula 1 are excluded in which Y and Z both represent a bond and simultaneously R16 is hydrogen, or in which Y represents –C(O)-, Z represents a bond and simultaneously R16 is hydrogen.

7. Compounds of formula 1 according to claim 4 in which

R1 and R2 together and with inclusion of the two carbon atoms, to which they are bonded, form the following group



R3 represents a phenyl derivative of formula (a)



wherein

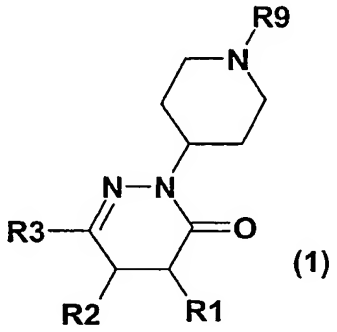
R4 is methoxy,

R5 is methoxy,

R9 is 2-(methanesulfonyl)ethanoyl, 2-benzofuran-2-yl-2-oxo-ethyl, 4-benzimidazol-1-ylbenzyl, 2-(4H-benzo[1,4]oxazin-3-one-6-yl)ethanoyl, 3-{2-[(1-morpholin-4-yl-methanoyl)-amino]-ethanesulfonyl}-propionyl, 2-(2-oxo-1,2-dihydroquinolin-6-yloxy)ethanoyl, 4-(2-oxo-1,2-dihydroquinolin-6-yloxy)butanoyl, 2-methoxyethyl, 2-methylsulfanylethyl, 2-methanesulfonylethyl or 2-(2-hydroxy-ethoxy)ethyl,

and the salts of these compounds.

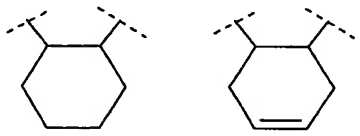
8. Compounds of formula 1,



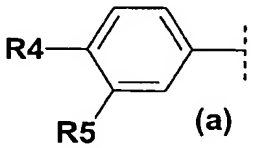
(1)

in which

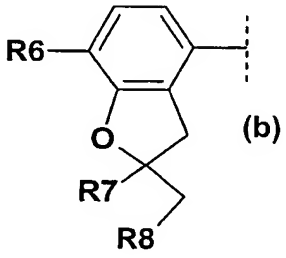
R1 and R2 represent independently from one another hydrogen or 1-4C-alkyl, or R1 and R2 together and with inclusion of the two carbon atoms, to which they are bonded, form a group selected from



R3 represents a phenyl derivative of formulae (a) or (b)



(a)



(b)

wherein

R4 is 1-4C-alkoxy or 1-4C-alkoxy which is completely or predominantly substituted by fluorine,

R5 is 1-8C-alkoxy, 3-7C-cycloalkoxy, 3-7C-cycloalkylmethoxy, or 1-4C-alkoxy which is completely or predominantly substituted by fluorine,

R6 is 1-4C-alkoxy, 3-5C-cycloalkoxy, 3-5C-cycloalkylmethoxy, or 1-4C-alkoxy which is completely or predominantly substituted by fluorine,

R7 is 1-4C-alkyl and

R8 is hydrogen or 1-4C-alkyl,

or wherein

R7 and R8 together and with inclusion of the two carbon atoms, to which they are bonded, form a spiro-linked 5-, 6- or 7-membered hydrocarbon ring, optionally interrupted by an oxygen or sulphur atom,

R9 is Aryl1, Aryl2 substituted by R10 and R11, $-(CH_2)_n$-C(O)-R12, -C(O)-$(CH_2)_m$-R13, -$(CH_2)_p$-R14 or -Y-$(CH_2)_q$-Z-$(CH_2)_r$-R16,

wherein

Aryl1 is naphthyl, pyrazinyl, pyridazinyl, pyrimidin-4-yl, pyrimidin-5-yl, quinazolinyl, quinoxalinyl, cinnolinyl, quinolyl, isoquinolyl, phthalazinyl, indanyl, indolyl, isoindolyl, indazolyl, chromanyl, isochromanyl, purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, isothiazolyl, pyrrolyl, pyrazolyl or thiophenyl,

Aryl2 is naphthyl, pyridyl, pyrazinyl, pyridazinyl, pyrimidinyl, quinazolinyl, quinoxalinyl, cinnolinyl, quinolyl, isoquinolyl, phthalazinyl, indanyl, indolyl, isoindolyl, indazolyl, chromanyl, isochromanyl, purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, pyrrolyl, pyrazolyl, furanyl or thiophenyl,

R10 is halogen, nitro, cyano, carboxyl, 1-4C-alkyl, trifluoromethyl, 1-4C-alkoxy, 1-4C-alkoxy which is completely or predominantly substituted by fluorine, 1-4C-alkoxycarbonyl, amino, mono- or di-1-4C-alkylamino, aminocarbonyl 1-4C-alkylcarbonylamino or mono-or di-1-4C-alkylaminocarbonyl,

R11 is hydrogen, halogen, amino, nitro, 1-4C-alkyl or 1-4C-alkoxy,

R12 is 4H-benzo[1,4]oxazin-3-one-6-yl, Aryl2 or Aryl2 substituted by R10 and R11,

R13 is 1-4C-alkoxy, phenoxy, napthalenoxy or 2-oxo-1,2-dihydro-quinolin-6-yloxy,

R14 is Aryl 3, Aryl2 substituted by R10 and R11, phenyl substituted by R15,

wherein

Aryl3 is naphthyl, pyrazinyl, pyridazinyl, pyrimidinyl, quinazolinyl, quinoxalinyl, cinnolinyl, quinolyl, isoquinolyl, phthalazinyl, indanyl, indolyl, isoindolyl, indazolyl, chromanyl, isochromanyl, purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, pyrrolyl, pyrazolyl, furanyl or thiophenyl,

R15 is purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, pyrrolyl, pyrazolyl, furanyl or thiophenyl,

R16 is hydrogen, hydroxyl, 1-4C-alkoxy, hydroxy-2-4C-alkoxy, 1-4C-alkoxy-1-4C-alkoxy, mono- or di-1-4C-dialkylamino, 1-4C-alkoxycarbonyl, amino, aminocarbonyl, mono- or di-1-4C-alkylaminocarbonyl, 1-4C-alkylcarbonyl, 1-4C-alkylcarbonylamino or –N(H)-C(O)-N(R18)R19,

Y represents a bond or –C(O)-,

Z represents a bond, –O-, -C(O)-, -C(O)-N(H)-, -N(H)-C(O)-, -N(R17)-, -S- or -$S(O)_2$-,

R17 is hydrogen or 1-4C-alkyl,

R18 and R19 are independent from each other hydrogen or 1-4C-alkyl, or R18 and R19 together and with inclusion of the nitrogen atom to which they are bonded, form a 4-morpholinyl-, 1-pyrrolidinyl-, 1-piperidinyl-, 1-hexahydroazepino- or a 1-piperazinyl-ring,

n is an integer from 1 to 4,

m is an integer from 1 to 4,

p is an integer from 1 to 4,

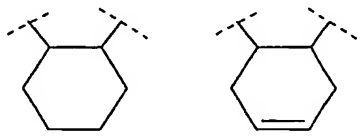
q is an integer from 1 to 4,

r is an integer from 1 to 4,

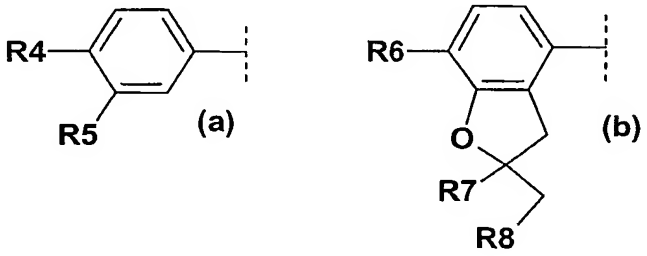
and the salts of these compounds – with the proviso that all those compounds of formula 1 are excluded in which Y and Z both represent a bond and R16 is hydrogen - for use in the treatment of diseases.

9. Use of compounds of formula 1 in which

R1 and R2 represent independently from one another hydrogen or 1-4C-alkyl, or R1 and R2 together and with inclusion of the two carbon atoms, to which they are bonded, form a group selected from



R3 represents a phenyl derivative of formulae (a) or (b)



wherein

R4 is 1-4C-alkoxy or 1-4C-alkoxy which is completely or predominantly substituted by fluorine,

R5 is 1-8C-alkoxy, 3-7C-cycloalkoxy, 3-7C-cycloalkylmethoxy, or 1-4C-alkoxy which is completely or predominantly substituted by fluorine,

R6 is 1-4C-alkoxy, 3-5C-cycloalkoxy, 3-5C-cycloalkylmethoxy, or 1-4C-alkoxy which is completely or predominantly substituted by fluorine,

R7 is 1-4C-alkyl and

R8 is hydrogen or 1-4C-alkyl,

or wherein

R7 and R8 together and with inclusion of the two carbon atoms, to which they are bonded, form a spiro-linked 5-, 6- or 7-membered hydrocarbon ring, optionally interrupted by an oxygen or sulphur atom,

R9 is Aryl1, Aryl2 substituted by R10 and R11, $-(CH_2)_n$-C(O)-R12, -C(O)-$(CH_2)_m$-R13, -$(CH_2)_p$-R14 or -Y-$(CH_2)_q$-Z-$(CH_2)_r$-R16,

wherein

Aryl1 is naphthyl, pyrazinyl, pyridazinyl, pyrimidin-4-yl, pyrimidin-5-yl, quinazolinyl, quinoxalinyl, cinnolinyl, quinolyl, isoquinolyl, phthalazinyl, indanyl, indolyl, isoindolyl, indazolyl, chromanyl, isochromanyl, purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, isothiazolyl, pyrrolyl, pyrazolyl or thiophenyl,

Aryl2 is naphthyl, pyridyl, pyrazinyl, pyridazinyl, pyrimidinyl, quinazolinyl, quinoxalinyl, cinnolinyl, quinolyl, isoquinolyl, phthalazinyl, indanyl, indolyl, isoindolyl, indazolyl, chromanyl, isochromanyl, purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, pyrrolyl, pyrazolyl, furanyl or thiophenyl,

R10 is halogen, nitro, cyano, carboxyl, 1-4C-alkyl, trifluoromethyl, 1-4C-alkoxy, 1-4C-alkoxy which is completely or predominantly substituted by fluorine, 1-4C-alkoxycarbonyl, amino, mono- or di-1-4C-alkylamino, aminocarbonyl 1-4C-alkylcarbonylamino or mono-or di-1-4C-alkylamino-carbonyl,

R11 is hydrogen, halogen, amino, nitro, 1-4C-alkyl or 1-4C-alkoxy,

R12 is 4H-benzo[1,4]oxazin-3-one-6-yl, Aryl2 or Aryl2 substituted by R10 and R11,

R13 is 1-4C-alkoxy, phenoxy, napthalenoxy or 2-oxo-1,2-dihydro-quinolin-6-yloxy,

R14 is Aryl 3, Aryl2 substituted by R10 and R11, phenyl substituted by R15,

wherein

Aryl3 is naphthyl, pyrazinyl, pyridazinyl, pyrimidinyl, quinazolinyl, quinoxalinyl, cinnolinyl, quinolyl, isoquinolyl, phthalazinyl, indanyl, indolyl, isoindolyl, indazolyl, chromanyl, isochromanyl, purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, pyrrolyl, pyrazolyl, furanyl or thiophenyl,

R15 is purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, pyrrolyl, pyrazolyl, furanyl or thiophenyl,

R16 is hydrogen, hydroxyl, 1-4C-alkoxy, hydroxy-2-4C-alkoxy, 1-4C-alkoxy-1-4C-alkoxy, mono- or di-1-4C-dialkylamino, 1-4C-alkoxycarbonyl, amino, aminocarbonyl, mono- or di-1-4C-alkylaminocarbonyl, 1-4C-alkylcarbonyl, 1-4C-alkylcarbonylamino or –N(H)-C(O)-N(R18)R19,

Y represents a bond or –C(O)-,

Z represents a bond, –O-, -C(O)-, -C(O)-N(H)-, -N(H)-C(O)-, -N(R17)-, -S- or -$S(O)_2$-,

R17 is hydrogen or 1-4C-alkyl,

R18 and R19 are independent from each other hydrogen or 1-4C-alkyl, or R18 and R19 together and with inclusion of the nitrogen atom to which they are bonded, form a 4-morpholinyl-, 1-pyrrolidinyl-, 1-piperidinyl-, 1-hexahydroazepino- or a 1-piperazinyl-ring,

n is an integer from 1 to 4,

m is an integer from 1 to 4,

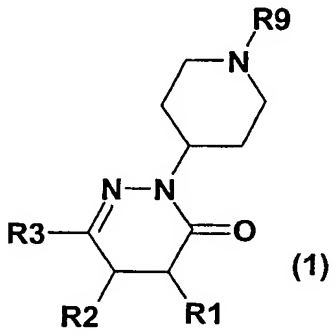
p is an integer from 1 to 4,

q is an integer from 1 to 4,

r is an integer from 1 to 4,

and the salts of these compounds – with the proviso that all those compounds of formula 1 are excluded in which Y and Z both represent a bond and R16 is hydrogen - for the preparation of pharmaceutical compositions for the treatment of diseases which can be ameliorated by the administration of PDE4 inhibitors.

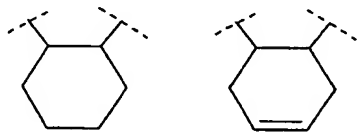
10. Compounds of formula 1



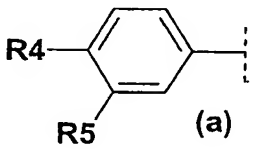
(1)

in which

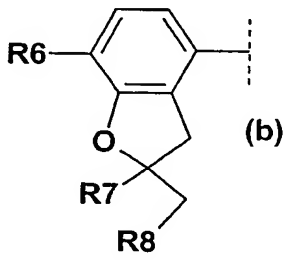
R1 and R2 represent independently from one another hydrogen or 1-4C-alkyl, or R1 and R2 together and with inclusion of the two carbon atoms, to which they are bonded, form a group selected from



R3 represents a phenyl derivative of formulae (a) or (b)



(a)



(b)

wherein

R4 is 1-4C-alkoxy or 1-4C-alkoxy which is completely or predominantly substituted by fluorine,

R5 is 1-8C-alkoxy, 3-7C-cycloalkoxy, 3-7C-cycloalkylmethoxy, or 1-4C-alkoxy which is completely or predominantly substituted by fluorine,

R6 is 1-4C-alkoxy, 3-5C-cycloalkoxy, 3-5C-cycloalkylmethoxy, or 1-4C-alkoxy which is completely or predominantly substituted by fluorine,

R7 is 1-4C-alkyl and

R8 is hydrogen or 1-4C-alkyl,

or wherein

R7 and R8 together and with inclusion of the two carbon atoms, to which they are bonded, form a spiro-linked 5-, 6- or 7-membered hydrocarbon ring, optionally interrupted by an oxygen or sulphur atom,

R9 is Aryl1, Aryl2 substituted by R10 and R11, $-(CH_2)_n$-C(O)-R12, -C(O)-$(CH_2)_m$-R13, -$(CH_2)_p$-R14 or -Y-$(CH_2)_q$-Z-$(CH_2)_r$-R16,

wherein

Aryl1 is naphthyl, pyrazinyl, pyridazinyl, pyrimidin-4-yl, pyrimidin-5-yl, quinazolinyl, quinoxalinyl, cinnolinyl, quinolyl, isoquinolyl, phthalazinyl, indanyl, indolyl, isoindolyl, indazolyl, chromanyl, isochromanyl, purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, isothiazolyl, pyrrolyl, pyrazolyl or thiophenyl,

Aryl2 is naphthyl, pyridyl, pyrazinyl, pyridazinyl, pyrimidinyl, quinazolinyl, quinoxalinyl, cinnolinyl, quinolyl, isoquinolyl, phthalazinyl, indanyl, indolyl, isoindolyl, indazolyl, chromanyl, isochromanyl, purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, pyrrolyl, pyrazolyl, furanyl or thiophenyl,

R10 is halogen, nitro, cyano, carboxyl, 1-4C-alkyl, trifluoromethyl, 1-4C-alkoxy, 1-4C-alkoxy which is completely or predominantly substituted by fluorine, 1-4C-alkoxycarbonyl, amino, mono- or di-1-4C-alkylamino, aminocarbonyl 1-4C-alkylcarbonylamino or mono-or di-1-4C-alkylaminocarbonyl,

R11 is hydrogen, halogen, amino, nitro, 1-4C-alkyl or 1-4C-alkoxy,

R12 is 4H-benzo[1,4]oxazin-3-one-6-yl, Aryl2 or Aryl2 substituted by R10 and R11,

R13 is 1-4C-alkoxy, phenoxy, napthalenoxy or 2-oxo-1,2-dihydro-quinolin-6-yloxy,

R14 is Aryl 3, Aryl2 substituted by R10 and R11, phenyl substituted by R15,

wherein

Aryl3 is naphthyl, pyrazinyl, pyridazinyl, pyrimidinyl, quinazolinyl, quinoxalinyl, cinnolinyl, quinolyl, isoquinolyl, phthalazinyl, indanyl, indolyl, isoindolyl, indazolyl, chromanyl, isochromanyl, purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, pyrrolyl, pyrazolyl, furanyl or thiophenyl,

R15 is purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, pyrrolyl, pyrazolyl, furanyl or thiophenyl,

R16 is hydrogen, hydroxyl, 1-4C-alkoxy, hydroxy-2-4C-alkoxy, 1-4C-alkoxy-1-4C-alkoxy, mono- or di-1-4C-dialkylamino, 1-4C-alkoxycarbonyl, aminocarbonyl, mono- or di-1-4C-alkylaminocarbonyl, 1-4C-alkylcarbonyl, 1-4C-alkylcarbonylamino or –N(H)-C(O)-N(R18)R19,

Y represents a bond or –C(O)-,

Z represents a bond, –O-, -C(O)-, -C(O)-N(H)-, -N(H)-C(O)-, -N(R17)-, -S- or -$S(O)_2$-,

R17 is hydrogen or 1-4C-alkyl,

R18 and R19 are independent from each other hydrogen or 1-4C-alkyl, or R18 and R19 together and with inclusion of the nitrogen atom to which they are bonded, form a 4-morpholinyl-, 1-pyrrolidinyl-, 1-piperidinyl-, 1-hexahydroazepino- or a 1-piperazinyl-ring,

n is an integer from 1 to 4,

m is an integer from 1 to 4,

p is an integer from 1 to 4,

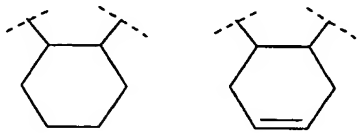
q is an integer from 1 to 4,

r is an integer from 1 to 4,

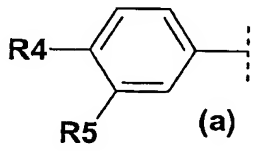
and the salts of these compounds – with the proviso that all those compounds of formula 1 are excluded in which Y and Z both represent a bond and R16 is hydrogen.

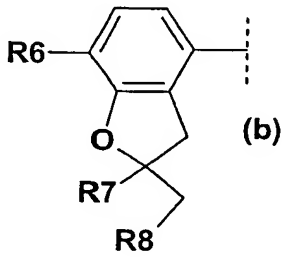
11. Compounds of formula 1 according to claim 4 in which

R1 and R2 represent independently from one another hydrogen or 1-4C-alkyl, or R1 and R2 together and with inclusion of the two carbon atoms, to which they are bonded, form a group selected from



R3 represents a phenyl derivative of formulae (a) or (b)





wherein

R4 is 1-2C-alkoxy or 1-2C-alkoxy which is completely or predominantly substituted by fluorine,

R5 is 1-4C-alkoxy,

R6 is 1-2C-alkoxy or 1-2C-alkoxy which is completely or predominantly substituted by fluorine,

R7 is methyl and

R8 is hydrogen,

or wherein

R7 and R8 together and with inclusion of the two carbon atoms, to which they are bonded, form a spiro-linked cyclopentane, cyclohexane, tetrahydrofurane or tetrahydropyran ring,

R9 is Aryl1, Aryl2 substituted by R10 and R11, $-(CH_2)_n$-C(O)-R12, -C(O)-$(CH_2)_m$-R13, -$(CH_2)_p$-R14 or -Y-$(CH_2)_q$-Z-$(CH_2)_r$-R16,

wherein

Aryl1 is pyrimidin-4-yl, pyrimidin-5-yl, quinazolinyl, quinolyl, isoquinolyl, indolyl, indazolyl, purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, isothiazolyl, pyrrolyl, pyrazolyl or thiophenyl,

Aryl2 is pyridyl, pyrimidinyl, quinazolinyl, quinolyl, isoquinolyl, indolyl, indazolyl, purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, pyrrolyl, pyrazolyl, furanyl or thiophenyl,

R10 is halogen, nitro, cyano, 1-4C-alkyl, 1-4C-alkoxy, 1-4C-alkoxycarbonyl, amino, mono-or di-1-4C-alkylamino, aminocarbonyl, 1-4C-alkylcarbonylamino or mono-or di-1-4C-alkylaminocarbonyl,

R11 is hydrogen, halogen, 1-4C-alkyl or 1-4C-alkoxy,

R12 is 4H-benzo[1,4]oxazin-3-one-6-yl, Aryl2 or Aryl2 substituted by R10 and R11,

R13 is phenoxy, napthalenoxy or 2-oxo-1,2-dihydro-quinolin-6-yloxy,

R14 is Aryl 3, Aryl2 substituted by R10 and R11, phenyl substituted by R15,

wherein

Aryl3 is pyrimidinyl, quinazolinyl, quinolyl, isoquinolyl, indolyl, indazolyl, purinyl, pteridinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, pyrrolyl, pyrazolyl, furanyl or thiophenyl,

R15 is purinyl, benzofuranyl, benzoxazolyl, benzothiazolyl, benzimidazolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, imidazolyl, furanyl or thiophenyl,

Y represents a bond or –C(O)-,

Z represents a bond, –O-, -S- or -$S(O)_2$-,

R16 is hydrogen, hydroxyl, 1-4C-alkoxy, hydroxy-2-4C-alkoxy, 1-4C-alkoxy-1-4C-alkoxy or -N(H)-C(O)-N(R18)R19,

wherein

R18 and R19 are independent from each other hydrogen or 1-4C-alkyl, or R18 and R19 together and with inclusion of the nitrogen atom to which they are bonded, form a 4-morpholinyl-, 1-pyrrolidinyl- or 1-piperidinyl -ring,

n is an integer from 1 to 2,

m is an integer from 1 to 3,

p is an integer from 1 to 2,

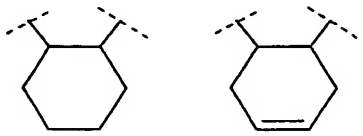
q is an integer from 1 to 3,

r is an integer from 1 to 2,

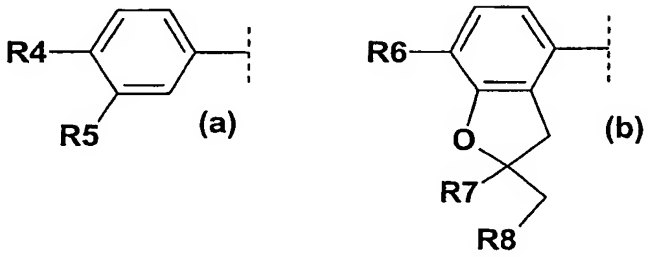
and the salts of these compounds – with the proviso that all those compounds of formula 1 are excluded in which Y and Z both represent a bond and R16 is hydrogen.

12. Compounds of formula 1 according to claim 4 in which

R1 and R2 together and with inclusion of the two carbon atoms, to which they are bonded, form a group selected from



R3 represents a benzene derivative of formulae (a) or (b)



wherein

R4 is 1-2C-alkoxy,

R5 is 1-4C-alkoxy,

R6 is 1-2C-alkoxy,

R7 is methyl and

R8 is hydrogen,

R9 is $-(CH_2)_n$-C(O)-R12, -C(O)-$(CH_2)_m$-R13, -$(CH_2)_p$-R14 or -Y-$(CH_2)_q$-Z-$(CH_2)_r$-R16,

wherein

R12 is 4H-benzo[1,4]oxazin-3-one-6-yl or benzofuran-2-yl,

R13 is 2-oxo-1,2-dihydro-quinolin-6-yloxy,

R14 is phenyl substituted by R15,

wherein

R15 is benzimidazolyl,

Y represents a bond or –C(O)-,

Z represents a bond, –O-, -S- or -$S(O)_2$-,

R16 is hydrogen, hydroxyl, methoxy, hydroxyethoxy, methoxyethoxy or -N(H)-C(O)-N(R18)R19,

wherein

R18 and R19 together and with inclusion of the nitrogen atom to which they are bonded, form a 4-morpholinyl-ring,

n is 1,

m is an integer from 1 to 3,

p is 1,

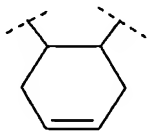
q is an integer from 1 to 3,

r is an integer from 1 to 2,

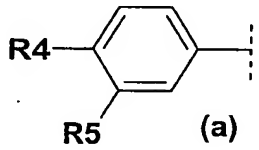
and the salts of these compounds – with the proviso that all those compounds of formula 1 are excluded in which Y and Z both represent a bond and R16 is hydrogen.

13. Compounds of formula 1 according to claim 4 in which

R1 and R2 together and with inclusion of the two carbon atoms, to which they are bonded, form the following group



R3 represents a phenyl derivative of formula (a)



wherein

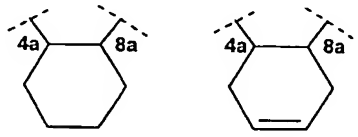
R4 is methoxy,

R5 is methoxy,

R9 is 2-(methanesulfonyl)ethanoyl, 2-benzofuran-2-yl-2-oxo-ethyl, 4-benzimidazol-1-ylbenzyl, 2-(4H-benzo[1,4]oxazin-3-one-6-yl)ethanoyl, 2-(2-oxo-1,2-dihydroquinolin-6-yloxy)ethanoyl, 4-(2-oxo-1,2-dihydroquinolin-6-yloxy)butanoyl, 2-methoxyethyl, 2-methylsulfanylethyl, 2-methanesulfonylethyl or 2-(2-hydroxy-ethoxy)ethyl,

and the salts of these compounds.

14. Compounds of formula 1 according to one of the claims 1 or 3-13, in which R1 and R2 together and with inclusion of the two carbon atoms, to which they are bonded, form a group selected from



and in which the hydrogen atoms in the positions 4a and 8a are cis-configurated .

15. Compounds of formula 1 according to claim 14 in which the absolute configuration (according to the rules of Cahn, Ingold and Prelog) is S in the position 4a and R in the position 8a.

16. Compounds of formula 1 according to claim 4 or 10 for the treatment of diseases.

17. Pharmaceutical compositions containing one or more compounds of formula 1 according to claim 4 or 10 together with the usual pharmaceutical auxiliaries and/or carrier materials.

18. Use of compounds of formula 1 according to claim 4 or 10 for the preparation of pharmaceutical compositions for the treatment of airway disorders.

19. A method for treating an illness treatable by the administration of a PDE4 inhibitor in a patient comprising administering to said patient in need thereof a therapeutically effective amount of a compound of formula 1 as claimed in claim 1.

20. A method for treating an illness treatable by the administration of a PDE4 inhibitor in a patient comprising administering to said patient in need thereof a therapeutically effective amount of a compound of formula 1 as claimed in claim 4.

21. A method for treating airway disorders in a patient comprising administering to said patient a therapeutically effective amount of a compound of formula 1 as claimed in claim 1.

22. A method for treating airway disorders in a patient comprising administering to said patient a therapeutically effective amount of a compound of formula 1 as claimed in claim 4.